

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-7 and 10-15 are currently pending, Claims 1 and 14 having been amended. The changes and additions to the claims do not add new matter and are supported by the originally filed specification, for example, on Fig. 8.

In the outstanding Office Action, Claims 1, 2, 3, 6, 7, 13 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Onggosanusi et al. (U.S. Pub. No. 2003/0139139, hereafter “Onggosanusi”) in view of Juntti et al. (U.S. Pub. No. 2003/0179814, hereafter “Juntti”) and Sugimoto et al. (U.S. Patent No. 6,661,836, hereafter “Sugimoto”); Claims 4 and 5 were rejected under 35 U.S.C. §103(a) as being unpatentable over Onggosanusi in view of Juntti, Sugimoto, and Walton et al. (U.S. Pub. No. 2004/0082356, hereafter “Walton”); Claims 10-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Onggosanusi in view of Juntti, Sugimoto, and Song et al. (U.S. Pub. No. 2004/0120415, hereafter “Song”); and Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Onggosanusi in view of Sugimoto.

With respect to the rejection of Claim 1 under 35 U.S.C. §103(a), Applicants respectfully submit that the clarifying amendment to Claim 1 overcomes this ground of rejection. Amended Claim 1 recites, *inter alia*,

wherein the multipath receiving signal demodulating units and the multipath interference canceling units are serially arranged in stages, a receiving signal received at each of the receiving antennas is directly inputted to all the serially coupled corresponding multipath interference canceling units without having passed through any of the other multipath interference canceling units, each of the stages other than the first stage updates a channel coefficient estimated based on a known pilot signal transmitted from the M transmitting antennas using a multipath interference cancelled signal provided by a multipath interference canceling unit in an upper stage.

Applicants submit that the applied art fails to disclose or suggest at least these features of amended Claim 1.

Onggosanusi is directed to a multiple input multiple output (MIMO) scheme for combining transmit diversity and data multiplexing. Onggosanusi describes that a receiver can directly estimate a channel (see para. [0017]). Onggosanusi also describes methods of interference-resistance detection, which include optimal maximum likelihood detection, linear detection, and iterative detection (see para. [0034]-[0038]).

The Office Action acknowledges that both Onggosanusi and Juntti fail to disclose or suggest a receiving signal received at each of the receiving antennas is inputted to a corresponding multipath interference canceling unit. (See Office Action, at page 4). Accordingly Applicants submit that both Onggosanusi and Juntti also fail to disclose or suggest “a receiving signal received at each of the receiving antennas is directly inputted to all the serially coupled corresponding multipath interference canceling units without being inputted through any of the other multipath interference canceling units,” as defined by amended Claim 1.

The Office Action relies on Sugimoto to remedy the deficiencies of Onggosanusi and Juntti with regard to Claim 1.

As previously presented, Fig. 1 of Sugimoto describes a receiving device for a CDMA communication system, which has a hybrid interference canceller (HIC) 12 that cancels interference in received data 10 and estimates and outputs a plurality of user symbols 13 (see col. 5, lines 37-39). Fig. 2 shows that the HIC 12 has three connected stages 16, 20, and 24. The first stage 16 performs correlation detection and maximum ratio combination with Rx Data 10 by use of Rake receipt circuits, executes signal correction and decision with the resulting signals in order to estimate the individual users' symbols and a residual signal 18, and feeds the symbols 18 to second stage 20 (see col. 5, lines 44-49). Stages 20 and 24 have

the same configuration as stage 16 (see col. 5, lines 50-55). Fig. 3 shows that exemplary stage 16 includes a first ICU group or interference canceling unit 26 and a second ICU group or interference canceling unit 30 (see col. 5, lines 65-67).

Furthermore, Fig. 6 of Sugimoto shows the first ICU group 26 of the first stage shown in Fig. 3, in which the received data is fed to a plurality of ICUs to produce interference estimates which are added together and the resulting sum is subtracted from the original received signal to cancel interference (see col. 7, lines 8-12). This produces a residual signal 28 which is output to the second ICU group 30 of the first stage, as shown in Fig. 7 (see col. 8, lines 49-60). Similarly, Figs. 8-9 shows the first and second ICU groups of the second stage of Fig. 4, and Figs. 10-11 show the first and second ICU groups of the third stage of Fig. 5.

The Office Action appears to take the position that Figs. 6-11 illustrate that the receiving signal is received at all stages of multipath interference cancelling units. Specifically, the examiner states the following on page 2:

Figures 6-11 illustrate receiving inputs are inputted through the second and third stages, via fig 8, 2nd stage ref. 43, 48, 54, 60 for 1st group of users and Fig. 9, ref. 80, ref 86, ref. 92 and ref. 98 for second group of users in 2nd stage and fig 10, 11 shows receiving inputs for 3rd stage for 1 and 2nd group of users. Therefore, the receiving signal is received at all stages of multipath interference canceling units.

However, Figs. 6-11 merely show a detailed view of the elements shown in Figs. 2-5. The signals 43, 48, 54 and 60 shown in Fig. 6 of Sugimoto, and the signals 80, 86, 92 and 98 shown in Fig. 7 of Sugimoto are not the same as the receiving signal received at each of the receiving antennas, but instead they are chip clocks (see col. 8, line 11 to col. 9, line 38). In other words, in Sugimoto, **the receiving signal 10** (which may be interpreted as the claimed “receiving signal”) is not directly inputted to all the serially coupled corresponding stages 16, 20, 24 without having passed through any of the other stages. As clearly shown in all of Figs.

2-11 of Sugiyama, the received signal Rx Data 10 is directly inputted only to the first ICU group 26 of the first stage, but is not directly inputted to the second ICU group 30 or other stages 20, 24 without having first passed through the first ICU group of the first stage.

Therefore, Sugiyama clearly does not disclose or suggest “a receiving signal received at each of the receiving antennas is *directly* inputted to all the serially coupled corresponding multipath interference canceling units *without having passed through any of the other multipath interference canceling units*,” as defined by amended Claim 1.

Therefore, Applicants submit that Sugiyama fails to remedy the deficiencies of Onggosanusi and Juntti with regard to amended Claim 1.

Walton and Song have been considered but also fail to remedy the deficiencies of Onggosanusi, Juntti, and Sugimoto with regard to amended Claim 1.

Therefore, Applicants respectfully submit that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Onggosanusi, Juntti, Sugimoto, Walton, and Song, either alone or in proper combination.

Amended independent Claim 14 recites features similar to those of amended Claim 1 discussed above. Therefore, Applicants respectfully submit that amended Claim 14 patentably distinguishes over Onggosanusi, Juntti, Sugimoto, Walton, and Song, either alone or in proper combination.

Consequently, in light of the above discussion and in view of the present amendment, the outstanding grounds for rejection are believed to have been overcome. The present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

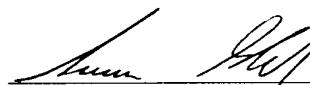
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